

AMENDMENTS TO THE CLAIMS

The following listing of claims replaces all prior listings, and all prior versions, of claims in the application.

LISTING OF CLAIMS:

1. (Currently Amended) An apparatus for handling sheets, comprising:

a sheet transfer member being movable, and having a transfer surface contactable with one of the sheets so that the one of the sheets is transferred by the sheet transfer member,

a sheet supporting surface area being contactable with the one of the sheet transferred by the sheet transfer member, said sheet supporting surface extending to be contactable with the one of the sheet between the transfer surface and the information reading point, and

an information reader arranged to face to the one of the sheet transferred by the sheet transfer member and having in an information reading range including an information reading point, in which reading range an information is securely readable from the one of the sheets,

wherein as seen in a view direction perpendicular to a thickness direction of the one of the sheets and a transferred direction of the one of the sheets transferred by the sheet transfer member, a tangential line of a boundary point of the transfer surface of the sheet transfer member from which boundary point the one of the sheets starts to separate away from the transfer surface extends in a side area of an imaginary straight line passing the information reading point and the boundary point, which side area including the sheet supporting surface area, and

wherein the tangential line intersects the sheet supporting surface area as seen in the view direction to press the one of the sheets against the sheet supporting surface area, and

wherein the one of the sheet transferred by the sheet transfer member is substantially planar with the sheet supporting surface area when in contact therewith.

2. (Cancelled)

3. (Previously Presented) An apparatus according to claim 1, wherein the sheet supporting surface area extends to guide therealong to the information reading range the one of the sheets transferred by the sheet transfer member.

4. (Cancelled)

5. (Cancelled)

6. (Previously Presented) An apparatus according to claim 1, wherein the tangential line is prevented from extending parallel to the imaginary straight line.

7. (Original) An apparatus according to claim 1, further comprising a supplemental sheet transfer member being movable, and having a supplemental transfer surface contactable with the one of the sheets so that the one of the sheets is transferred by the supplemental sheet transfer member, wherein a tangential line of a boundary point of the transfer surface of the sheet transfer member from which

boundary point the one of the sheets starts to separate away from the transfer surface of the sheet transfer members intersects with a tangential line of a boundary point of the supplemental transfer surface of the supplemental sheet transfer member from which boundary point the one of the sheets starts to separate away from the supplemental transfer surface of the supplemental sheet transfer member as seen in a view direction perpendicular to a thickness direction of the one of the sheets and a transferred direction of the one of the sheets transferred by the sheet transfer member.

8. (Previously presented) An apparatus according to claim 1, further comprising a supplemental sheet transfer member being movable and having a supplemental transfer surface contactable with the one of the sheets so that the one of the sheets is transferred by the supplemental sheet transfer member, and first and second press members being opposed to the sheet transfer member and supplemental sheet transfer member respectively in such a manner that the one of the sheets is allowed to be pressed between the sheet transfer member and the first press member in a first press direction and between the supplemental sheet transfer member and the second press member in a second press direction, wherein the first and second press directions intersect with each other as seen in a view direction perpendicular to a thickness direction of the one of the sheets and a transferred direction of the one of the sheets transferred by the sheet transfer member.

9. (Currently Amended) An apparatus for handling sheets, comprising:

a sheet transfer member being movable, and having a transfer surface contactable with one of the sheets so that the one of the sheets is transferred by the sheet transfer member,

a sheet supporting surface area being contactable with the one of the sheet transferred by the sheet transfer member,

an information reader arranged to face to the one of the sheet transferred by the sheet transfer member and having in an information reading range including an information reading point, in which reading range an information is securely readable from the one of the sheets, and

a press member being opposed to the sheet transfer member in such a manner that the one of the sheets is allowed to be pressed between the sheet transfer member and the press member at a boundary point in a press direction,

wherein an imaginary straight line passing the boundary point in a direction perpendicular to the press direction intersects the sheet supporting surface area as seen in a view direction perpendicular to a thickness direction of the one of the sheets and a transferred direction of the one of the sheets transferred by the sheet transfer member, and

wherein the one of the sheet transferred by the sheet transfer member is substantially planar with the sheet supporting surface area when in contact therewith.

10. (Previously Presented) An apparatus according to claim 1, further comprising a press member being opposed to the sheet transfer member in such a manner that the one of the sheets is allowed to be pressed between the sheet transfer member and the press member, wherein the press member has a press

surface contactable with the one of the sheets so that the one of the sheets is allowed to be pressed between the press and transfer surfaces, and a compression resistance surface rigidity of one of the press and transfer surfaces is different from that of the other one of the press and transfer surfaces in such a manner that a tangential line of a boundary point of at least one of the press and transfer surfaces from which boundary point the one of the sheets starts to separate away from the at least one of the press and transfer surfaces extends in the side area of the imaginary straight line.

11. (Original) An apparatus according to claim 1, wherein the sheet transfer member is a roller rotatable on an rotational axis.

12. (Original) An apparatus according to claim 1, wherein the sheet transfer member is a belt rotatable along an annular course.

13. (Cancelled).

14. (Original) An apparatus according to claim 1, wherein the information reader has a pair of input points opposed to each other in such a manner that the input points face to respective sides of the one of the sheet in a thickness direction of the one of the sheets to read the information through the input points.

15. (Currently Amended) An apparatus according to claim 1, wherein as seen in a view direction perpendicular to a thickness direction of the one of the sheets and a transferred direction of the one of the sheets transferred by the sheet

transfer member, when the sheet supporting surface area extends straightly in parallel to a support line direction and passes the information reading range, α is an inclination angle between the support line direction and a tangential line of a boundary point of the transfer surface of the sheet transfer member from which boundary point the one of the sheets starts to separate away from the transfer surface, L is a distance between the boundary point of the transfer surface of the sheet transfer member and the information reading point in the support line direction, h is a distance between the boundary point of the transfer surface of the sheet transfer member and the sheet supporting surface area in a direction perpendicular to the support line direction, and μ_{pg} is a frictional coefficient between the one of the sheets and the transfer surface of the sheet transfer member, $\tan^{-1}(h/L) < \alpha < \tan^{-1}(1/\mu_{pg})$.

16. (Currently Amended) An apparatus for handling sheets comprising:
- a sheet transfer member being movable, and having a transfer surface contactable with one of the sheets so that the one of the sheets is transferred by the sheet transfer member,
 - a sheet supporting surface area being contactable with the one of the sheet transferred by the sheet transfer member, and
 - an information reader arranged to face to the one of the sheet transferred by the sheet transfer member and having in an information reading range including an information reading point, in which reading range an information is securely readable from the one of the sheets,

wherein as seen in a view direction perpendicular to a thickness direction of the one of the sheets and a transferred direction of the one of the sheets transferred by the sheet transfer member, when the sheet supporting surface area extends straightly in parallel to a support line direction and passes the information reading range, α is an inclination angle between the support line direction and a tangential line of a boundary point of the transfer surface of the sheet transfer member from which boundary point the one of the sheets starts to separate away from the transfer surface, L is a distance between the boundary point of the transfer surface of the sheet transfer member and the information reading point in the support line direction, h is a distance between the boundary point of the transfer surface of the sheet transfer member and the sheet supporting surface area in a direction perpendicular to the support line direction, μpg is a frictional coefficient between the one of the sheets and the transfer surface of the sheet transfer member, and J is a distance in the direction perpendicular to the support line direction between the boundary point and an intersecting point between an imaginary line passing the information reading point and extending perpendicular to the support line direction and an imaginary line passing the boundary point of the transfer surface of the sheet transfer member and extending perpendicular to the tangential line of the boundary point of the transfer surface of the sheet transfer member, $J < \frac{h}{L^2} (L^2/h)$, and $\alpha < \tan^{-1}(1/\mu pg)$, and

wherein the one of the sheet transferred by the sheet transfer member is substantially planar with the sheet supporting surface area when in contact therewith.

17. (Original) An apparatus according to claim 1, further comprising a supplemental sheet supporting surface area opposed to the sheet supporting surface area, contactable with the one of the sheets, and movable with respect to the sheet supporting surface area in such a manner that the one of the sheets contacting the supplemental sheet supporting surface area and transferred by the sheet transfer member is urged in a direction toward the sheet supporting surface area.

18. (Original) An apparatus according to claim 17, wherein the supplemental sheet supporting surface area is opposed to the information reading range so that the one of the sheets contacting the supplemental sheet supporting surface area and transferred by the sheet transfer member is urged in a direction toward the information reading range.

19. (Original) An apparatus according to claims 1, further comprising a supplemental sheet supporting surface area being opposed to the sheet supporting surface area and contactable with the one of the sheets, and extending in such a manner that the one of the sheets contacting the supplemental sheet supporting surface area and transferred by the sheet transfer member is guided toward the sheet supporting surface area.

20. (Original) An apparatus according to claim 1, wherein the sheet supporting surface area is curved.

21. (Currently Amended) An apparatus for handling sheets, comprising:

a sheet transfer member being movable, and having a transfer surface contactable with one of the sheets so that the one of the sheets is transferred by the sheet transfer member,

a sheet supporting surface area being contactable with the one of the sheet transferred by the sheet transfer member,

an information reader arranged to face to the one of the sheet transferred by the sheet transfer member and having in an information reading range including an information reading point, in which reading range an information is securely readable from the one of the sheets, and

a distance detector arranged to face to the one of the sheets so that a value changing in accordance with a change in distance between the one of the sheets and the information reader is measured by the distance detector,

wherein the information reader includes a light emitter for projecting a light to the one of the sheets and a light receiver for receiving the light reflected by the one of the sheets to read the information from the one of the sheets, and the light emitter is controlled in accordance with the value in such a manner that an intensity of the light emitted by the light emitter is increased in accordance with the increase of distance between the one of the sheets and the information reader, and

wherein the one of the sheet transferred by the sheet transfer member is substantially planar with the sheet supporting surface area when in contact therewith.

22. – 23. (Cancelled)

24. (Currently Amended) An apparatus for handling sheets, further comprising:

a sheet transfer member being movable, and having a transfer surface contactable with one of the sheets so that the one of the sheets is transferred by the sheet transfer member,

a sheet supporting surface area being contactable with the one of the sheet transferred by the sheet transfer member,

an information reader arranged to face to the one of the sheet transferred by the sheet transfer member and having in an information reading range including an information reading point, in which reading range an information is securely readable from the one of the sheets, and

a pneumatic blower for applying a pneumatic pressure to the one of the sheets in such a manner that the one of the sheets is urged by the pneumatic pressure to be pressed against the sheet supporting surface area,

wherein the one of the sheet transferred by the sheet transfer member is substantially planar with the sheet supporting surface area when in contact therewith.

25. (New) The apparatus according to claim 1, wherein:

the sheet transfer member includes a drive roller and a driven roller mounted along a clamping direction line;

α is an inclination angle between a support line direction and a tangential line of a boundary point of the transfer surface of the sheet transfer member from which

boundary point the one of the sheets starts to separate away from the transfer surface;

the clamping direction line is inclined by the angle α causing an offset between the drive roller and the driven roller.